

Use of the Exciting Acid

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remains no other electricity to be accounted for or to be referred to any action other than that of the zinc and the water on each other.

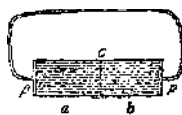


Fig. 39.

662. The general case (for it includes the former one (659)) of acids and bases may theoretically be stated in the following manner. Let *a*, fig. 39, be supposed to be a dry oxacid, and *b* a dry base, in contact at *c*, and in electric communication at their extremities by plates of platina *p p*, and a platina wire *w*. If this acid and base were fluid, and combination took place at *c*, with an affinity ever so vigorous, and capable of originating an electric current, the current could not circulate in any important degree; because, according to the experimental results, neither *a* nor *b* could conduct without being decomposed, for they are either electrolytes or else insulators, under all circumstances, except to very feeble and unimportant currents (705, 721). Now the affinities at *c* are not such as tend to cause the *elements* either of *a* or *b* to separate, but only such as would make the two bodies combine together as a whole; the point of action is, therefore, insulated, the action itself local (656, 682), and no current can be formed.

6630 If the acid and base be dissolved in water, then it is possible that a small portion of the electricity due to chemical action may be conducted by the water without decomposition (701, 719); but the quantity will be so small as to be utterly disproportionate to that due to the equivalents of chemical force; will be merely incidental; and, as it does not involve the essential principles of the voltaic pile, it forms no part of the phenomena at present under investigation.¹

664. If for the oxacid a hydracid be substituted (662)—as one analogous to the muriatic, for instance—then the state of things changes altogether, and a current due to the chemical action of the acid on the base is possible. But now both the bodies act as electrolytes, for it is only one principle of each which combine mutually—as, for instance, the chlorine with the metal—and the hydrogen of the acid and the oxygen of the base are ready to traverse with the chlorine of the acid and the metal

¹ It will I trust be fully understood that in these investigations I am not professing to take an account of every small, incidental, or barely possible effect, dependent upon slight disturbances of the

electric fluid
during chemical action, but am seeking to distinguish and
identify those
actions on which the power of the voltaic battery
essentially depends.